

5           1.     An improved method of cementing casing in a deep water offshore formation penetrated by a well bore comprising the steps of:

                  (a) preparing a foamed cement composition comprised of calcium aluminate cement, a set accelerating additive, a thickening time increasing additive, water in an amount sufficient to form a slurry, a gas in an amount sufficient to form a foam and  
10   a mixture of cement composition foam forming and foam stabilizing surfactants present in an amount sufficient to facilitate the formation of and stabilize said foam;

                  (b) placing said cement composition in the annulus between said casing and said well bore; and

                  (c) allowing said cement composition to set into a hard impermeable mass  
15   therein.

                  2.     The method of claim 1 wherein said set accelerating additive is selected from the group consisting of lithium chloride, lithium carbonate, lithium sulfate and lithium hydroxide.

20               3.     The method of claim 1 wherein said set accelerating additive is lithium chloride.

4. The method of claim 1 wherein said set accelerating additive is present in said cement composition in an amount in the range of from about 0.1% to about 1.0% by weight of cement in said cement composition.

5 5. The method of claim 1 wherein said thickening time increasing additive is selected from the group consisting of citric acid, gluconic acid and tartaric acid.

6. The method of claim 1 wherein said thickening time increasing additive is citric acid.

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7. The method of claim 1 wherein said thickening time increasing additive is present in said cement composition in an amount in the range of from about 0.5% to about 2.0% by weight of cement in said cement composition.

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8. The method of claim 1 wherein said water is selected from the group of fresh water and salt water.

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9. The method of claim 1 wherein said gas is selected from the group of air and nitrogen.

10. The method of claim 1 wherein said gas is present in an amount sufficient to lower the density of said foam to in the range of from about 10 to about 12 pounds per gallon.

11. The method of claim 1 wherein said mixture of foam forming and foam stabilizing surfactants in said cement composition comprises a mixture of an alcohol ether sulfate ethoxylated with from about 3 to about 10 moles of ethylene oxide, an alkyl or alkene amidopropylbetaine and an alkyl or alkene amidopropyl dimethylamine oxide.

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12. The method of claim 1 wherein said mixture of cement composition foaming and foam stabilizing surfactants is present in said cement composition in an amount in the range of from about 1.0% to about 4.0% by weight of water in said composition.

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13. An improved method of cementing casing in a deep water offshore formation penetrated by a well bore comprising the steps of:

(a) preparing a foamed cement composition comprised of high alumina content calcium aluminate cement, a set accelerating additive comprised of lithium chloride, a thickening time increasing additive comprised of citric acid, water in an amount sufficient to form a slurry, a gas in an amount sufficient to form a foam and a mixture of cement composition foam forming and foam stabilizing surfactants present in an amount sufficient to facilitate the formation of and stabilize said foam;

(b) pumping said cement composition into the annulus between said casing and said well bore; and

(c) allowing said cement composition to set into a hard impermeable mass therein.

14. The method of claim 13 wherein said set accelerating additive is present in said cement composition in an amount in the range of from about 0.2% to about 0.5% by weight of cement in said cement composition.

5 15. The method of claim 13 wherein said thickening time increasing additive is present in said cement composition in an amount in the range of from about 0.5% to about 1.5% by weight of cement in said cement composition.

10 16. The method of claim 13 wherein said water is selected from the group of fresh water and salt water.

15 17. The method of claim 13 wherein said water is present in said cement composition in an amount in the range of from about 40% to about 50% by weight of cement in said cement composition.

18. The method of claim 13 wherein said gas is nitrogen and is present in an amount sufficient to lower the density of said foam to in the range of from about 10 to about 12 pounds per gallon.

20 19. The method of claim 13 wherein said mixture of foam forming and foam stabilizing surfactants in said cement composition comprises a mixture of an alcohol ether sulfate ethoxylated with from about 3 to about 10 moles of ethylene oxide, an alkyl or alkene amidopropylbetaine and an alkyl or alkene amidopropyldimethylamine oxide.

20. The method of claim 13 wherein said mixture of cement composition  
foaming and foam stabilizing surfactants is present in said cement composition in an  
amount in the range of from about 2.0% to about 3.0% by weight of water in said  
5 composition.

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